



Investment Strategy for Athens, Greece

Intro to business problem

- ▶ Greece is rapidly overcoming its financial crisis as financial and economic indices show. There is a large potential for profit.
- ▶ We focus on the area of the Athens city center.
- ▶ We use data in order to analyze which investments are considered profitable and which will face large competition and thus have minimal potential for a large market share.

Obtaining Data

- We use data from the Foursquare API containing info about venues there

	name	categories	address	cc	city	country	crossStreet	distance	formattedAddress	labeledLatLngs	lat	lng	neighb
0	National Theatre of Greece (Εθνικό Θέατρο)	Theater	Αγίου Κωνσταντίνου 22-24	GR	Αθήνα	Ελλάδα	NaN	203	[Αγίου Κωνσταντίνου 22-24, 104 37 Αθήνα, Αττικ...	[{"label": "display", "lat": 37.98474217257332...	37.984742	23.725541	
1	Στάνη Γαλακτοπωλείο	Dessert Shop	Μαρίκας Κοτοπούλη 10	GR	Αθήνα	Ελλάδα	Βερανζέρου	186	[Μαρίκας Κοτοπούλη 10 (Βερανζέρου), 104 32 Αθή...	[{"label": "display", "lat": 37.98546282764882...	37.985463	23.727908	Metax
2	Loukoumades Ktistakis (Λουκουμάδες Χανίων Θ. Κ...	Donut Shop	Σωκράτους 59	GR	Αθήνα	Ελλάδα	NaN	69	[Σωκράτους 59, 104 31 Αθήνα, Αττική, Ελλάδα]	[{"label": "display", "lat": 37.98393592722866...	37.983936	23.726768	
3	Της Θεάτρου Το Στέκι	Kafenio	7 Theatrou St	GR	Αθήνα	Ελλάδα	NaN	393	[7 Theatrou St, Αθήνα, Αττική, Ελλάδα]	[{"label": "display", "lat": 37.98070281296481...	37.980703	23.725394	
4	Τράτα	Fish Taverna	Νικηταρά 9	GR	Αθήνα	Ελλάδα	Θεμιστοκλέους 8	301	[Νικηταρά 9 (Θεμιστοκλέους 8), 106 78 Αθήνα, Α...	[{"label": "display", "lat": 37.98421877664627...	37.984219	23.730939	Athen
5	Taf Coffee	Coffee Shop	Εμμανουήλ Μπενάκη 7	GR	Αθήνα	Ελλάδα	NaN	293	[Εμμανουήλ Μπενάκη 7, 106 78 Αθήνα, Αττική, Ελ...	[{"label": "display", "lat": 37.98345088308742...	37.983451	23.730853	
6	Καραμανλίδικα του Φάνη	Meze Restaurant	Σωκράτους 1	GR	Αθήνα	Ελλάδα	Ευριπίδου 52	434	[Σωκράτους 1 (Ευριπίδου 52), 105 54 Αθήνα, Ατπ...	[{"label": "display", "lat": 37.98016872811729...	37.980169	23.725757	

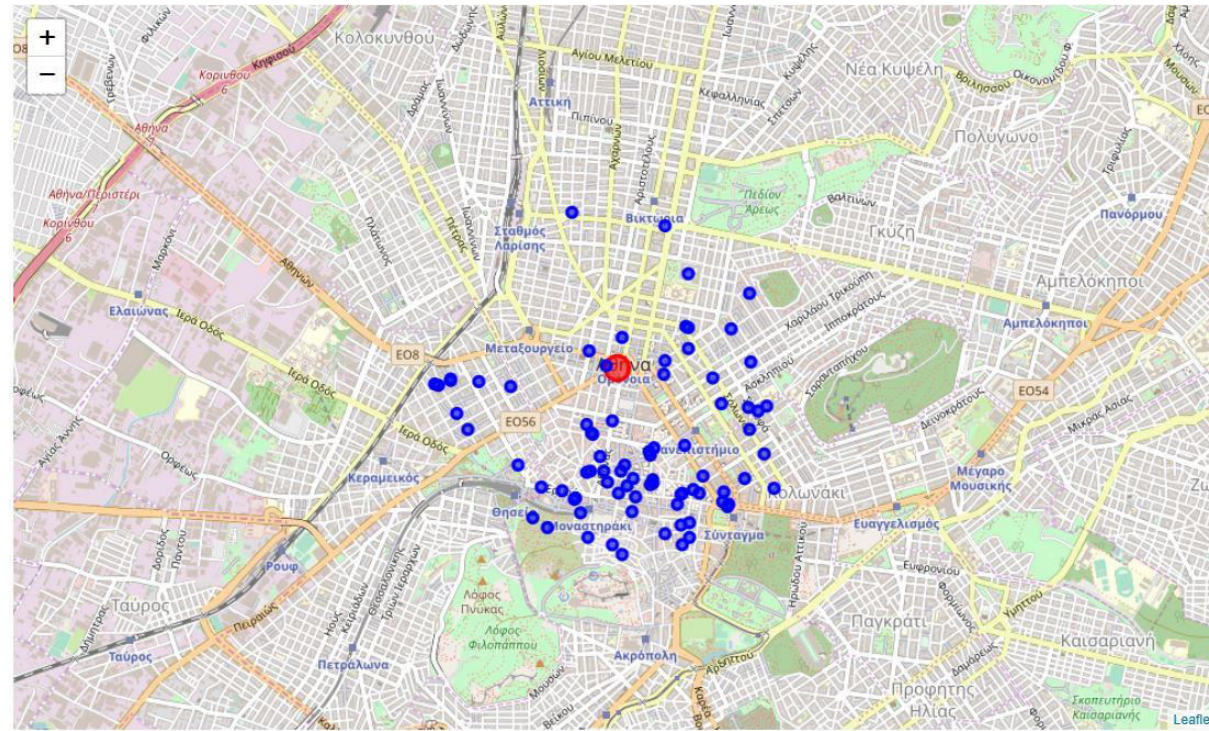
Cleaning the data

- We drop unnecessary info.

	name	categories	address	distance	labeledLatLngs	lat	lng	neighborhood	postalCode	id
0	National Theatre of Greece (Εθνικό Θέατρο)	Theater	Αγίου Κωνσταντίνου 22-24	203	[{"label": "display", "lat": 37.98474217257332...	37.984742	23.725541	NaN	104 37	4e822369f5b91d2e46d16f27
1	Στάνη Γαλακτοπωλείο	Dessert Shop	Μαρίκας Κοτοπούλη 10	186	[{"label": "display", "lat": 37.98546282764882...	37.985463	23.727908	Metaxourgeio	104 32	4c038ca13f03b713b6fb5141
2	Loukoumades Ktistakis (Λουκουμάδες Χανίων Θ. Κ...	Donut Shop	Σωκράτους 59	69	[{"label": "display", "lat": 37.98393592722866...	37.983936	23.726768	NaN	104 31	4d4bdade1ae43704f77ced60
3	Της Θεάτρου Το Στέκι	Kafenio	7 Theatrou St	393	[{"label": "display", "lat": 37.98070281296481...	37.980703	23.725394	NaN	NaN	55156e65498eb8bdba7fd799
4	Τράτα	Fish Taverna	Νικηταρά 9	301	[{"label": "display", "lat": 37.98421877664627...	37.984219	23.730939	Omonia, Athens, Attica	106 78	4df4a6d218a88611c6c0c27e
5	Taf Coffee	Coffee Shop	Εμμανουήλ Μπενάκη 7	293	[{"label": "display", "lat": 37.98345088308742...	37.983451	23.730853	NaN	106 78	4b64103df964a520759d2ae3

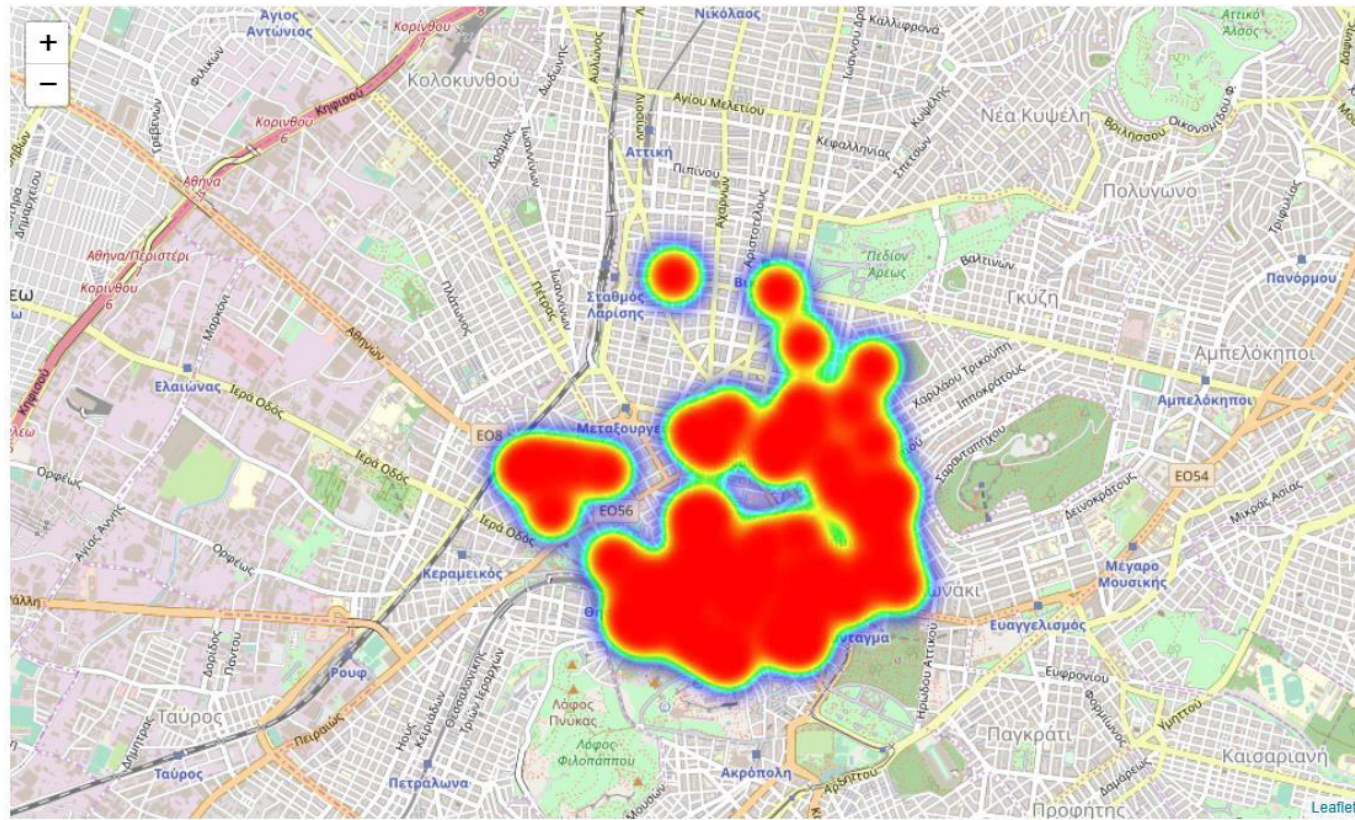
Methodology and exploratory analysis

- First we create a spatial visualization of our data and we examine density



Heatmap

- We detect high density south and southeast, thus a heatmap is helpful



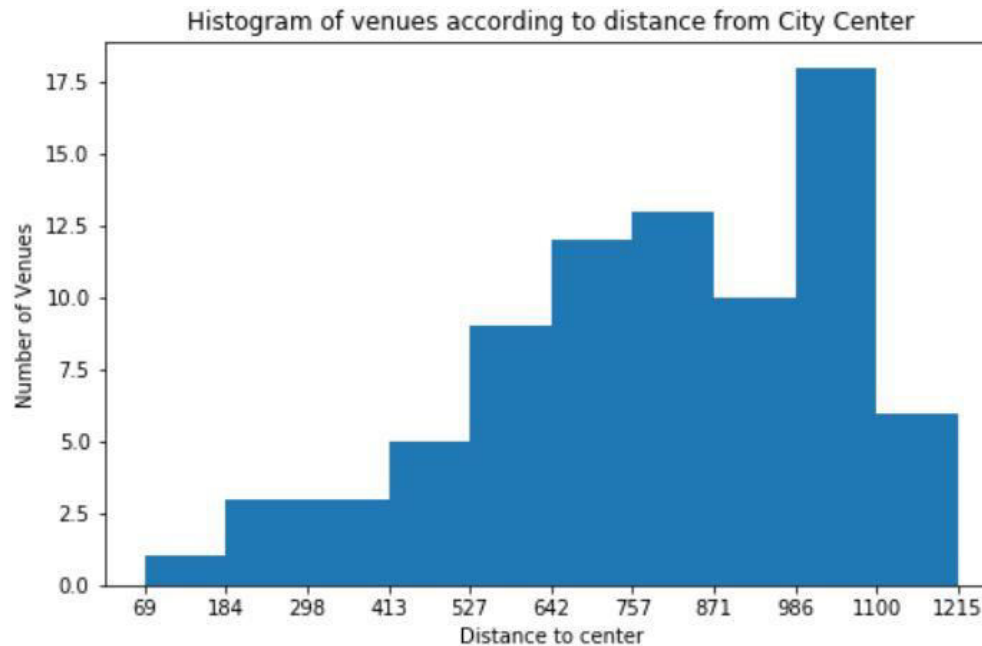
Highest competition

- The most present venues are the following. Investors are advised to avoid them due to high competition. They are considered risky.

categories	Number
Bar	7
Café	5
Cocktail Bar	6
Coffee Shop	7
Dessert Shop	4
Wine Bar	4

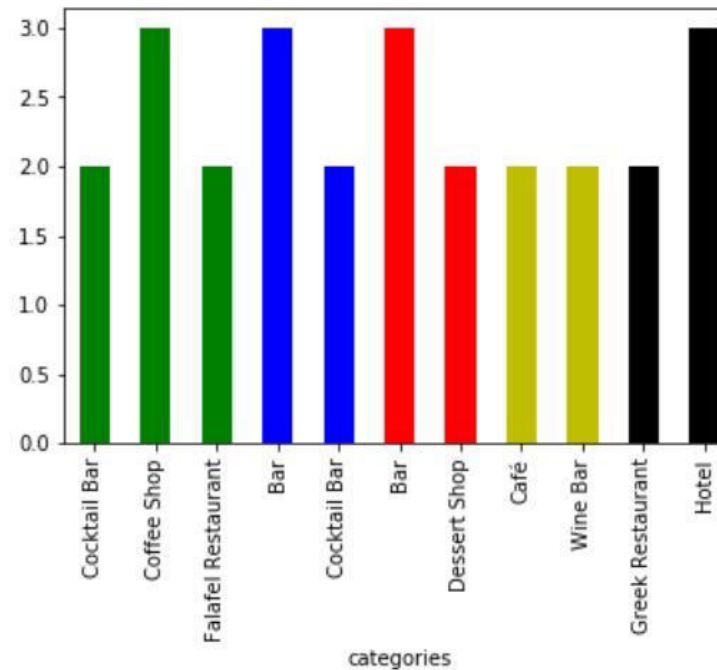
Density according to distance from the city center

- Here is the Histogram demonstrating this. There is an opportunity gap between 871 and 986 meters from the city center

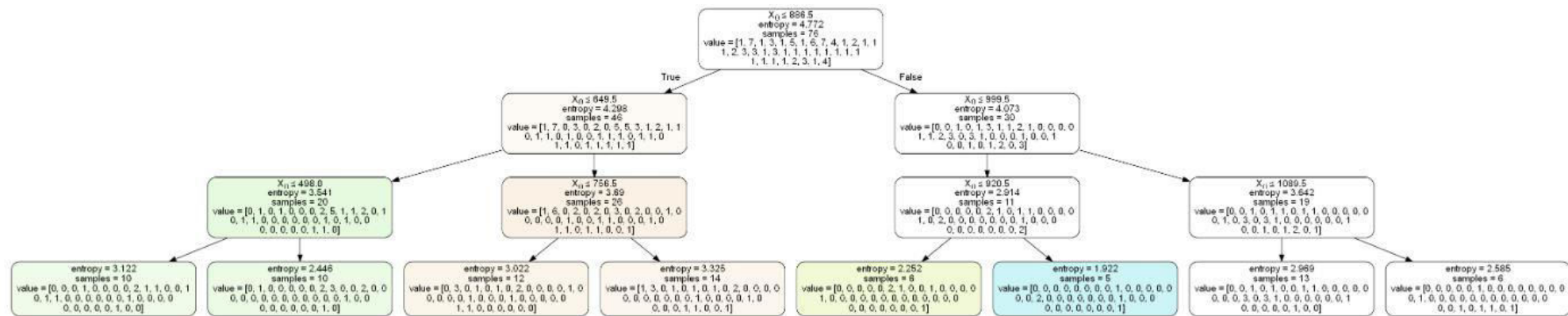


Highest competition grouped with respect to distance from the city center

- This is the grouped histogram

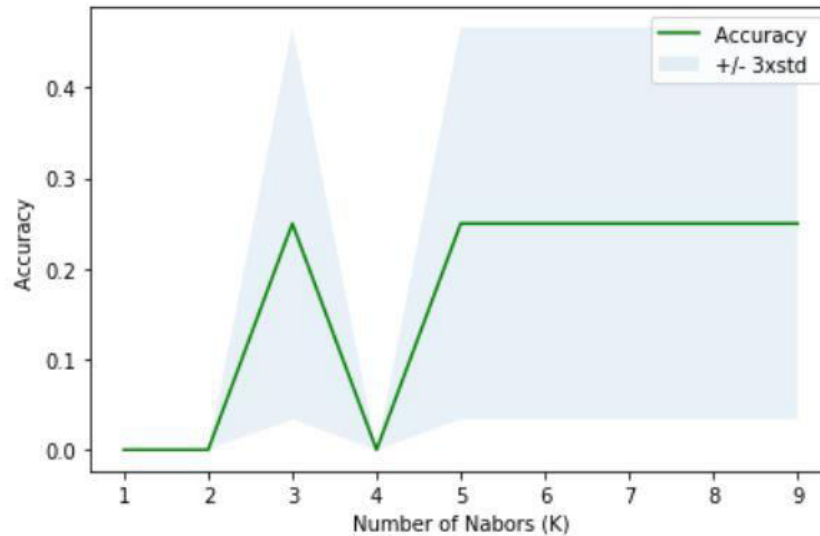


- ▶ Although there is a drop in entropy at each step, it is not significant. The resulting decision tree is pretty inaccurate with accuracy 0.25.



Predictive models (KNN)

- The method of K Nearest Neighbors did not prove more accurate. Our data is very limited. Its maximum accuracy is again 0.25. The optimal K's are shown below



Predictive models (SVM)

- ▶ Support Vector machine also proved highly inaccurate so we do not include it in our analysis and presentation

Results

- ▶ Investors should avoid investing on venues contained in the table of high competition above
- ▶ They should try to expand in a circular way around the city center filling the red cloud of the heatmap
- ▶ The north areas appear to face less competition
- ▶ The predictive models proved to be weak so they should not be used to make educated decisions about investments at this point
- ▶ More data is required such as criminal records, operating costs, profit etc... Those are not accessible for free so beyond the scope of this project

Conclusion and future directions

- ▶ Accuracy of the models have much room for improvement. This is the future direction
- ▶ Maps and statistical analysis (Histograms) help the most with our analysis
- ▶ We performed analysis purely based on location. Investors should conduct further analysis regarding other aspects such as financial and security ones